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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/809,423

03/26/2004

Takayoshi Togino

12219/46

6816

23838 7590 12/10/2008

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EXAMINER

SELBY, GEVELL V

ART UNIT

PAPER NUMBER

2622

MAIL DATE

DELIVERY MODE

12/10/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/809,423	Applicant(s) TOGINO, TAKAYOSHI	
	Examiner GEVELL SELBY	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 8/18/08 have been fully considered but they are not persuasive. The applicant submits the prior art does not disclose the following limitations of the prior art does not disclose the following limitations of the claimed invention:

each of said plurality of imaging units comprises an imaging lens and an imaging device located on an image plane of said imaging lens, said plurality of imaging units are two-dimensionally arranged in rows and columns, with an optical axis of each imaging unit defined as an axis through a common object point at an imaging position and the center of each imaging lens, directions of the optical axes of the imaging units adjacent to each other are different, said common object point and each imaging device are located at a conjugate position, as stated in claim 1. The Examiner respectfully disagrees.

Examiner's Reply:

Re claim 1) The Takahashi reference discloses each of said plurality of imaging units (see figure 4A, elements 1 and para 43-48) comprises an imaging lens (see figure 4A, elements 4) and an imaging device (see figure 4A, element 4) located on an image plane of said imaging lens, said plurality of imaging units are two-dimensionally arranged in rows and columns, (see figure 4A) with an optical axis of each imaging unit defined as an axis through a common object point at an imaging position and the center of each imaging lens (see figure 4B: the optical axis of the image sensors on each side of the middle pixel is angled inward toward the middle pixel such that the optical axes of the sensors will all intercept at a common object point), directions of the optical axes of the

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imaging units adjacent to each other are different (see figure 4A and 4B: the lens of each of the sensors is shifted causing the adjacent imaging units to each have an optical axis in a different direction), said common object point and each imaging device are located at a conjugate position (see figure 4B: the common object point where each of the optical axes intersect is located at a conjugate position). The Takahashi reference teaches to shift the lens of each image sensor in relation to the center of the array, so that the light from an object being photographed will properly focus on the center of the image sensor and not be blocked by the light shielding member (see para 47-48), thus reducing shading. When modifying the imaging device of the Takada reference with the imaging array of the Takahashi reference, that combination discloses all the claimed limitations of claim 1.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-3, 5-10, and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322.**

In regard to claim 1, Takada et al., US 7,176,973, discloses an imaging system, comprising:

an imaging unit (see figure 8, element 34), and

an illumination device (see figure 8, element 28), wherein: said imaging unit comprises an imaging lens (see figure 8, element 32) and an imaging device (see figure 8, element 36) located on an image plane of said imaging lens,

with an optical axis of each imaging unit defined as an axis through a common object point (see figure 8, element 12a) at an imaging position and a center of each imaging lens, said common object point and each imaging device are located at a conjugate position (see figure 8, dashed line: the optical axis, dashed line, passes through a common object point of the pupil 12a and the imaging device); and

said illumination device is positioned in such a way as to direct illumination light in a direction along an optical axis of each imaging unit (see figure 8: the illumination light as directed along the optical axis of the imaging unit after reflecting off mirror 22).

The Takada reference does not disclose that the imaging system discloses a plurality of imaging units comprising a lens and an imaging device, said plurality of imaging units are two-dimensionally arranged in rows and columns, or wherein the directions of the optical axes of the imaging units adjacent to each other are different.

Takahashi et al., US 2001/0026322, discloses an imaging system comprising a plurality of imaging units wherein each imaging unit comprises a micro lens (see figures 4A and 4B, elements 4), and an imaging device (see figures 4A and 4B, element 1), said plurality of imaging units are two-

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dimensionally arranged in rows and columns (see figure 4A), with an optical axis of each imaging unit defined as an axis through a common object point at an imaging position and the center of each imaging lens (see figure 4B: the optical axis of the image sensors on each side of the middle pixel is angled inward toward the middle pixel such that the optical axes of the sensors will all intercept at a common object point), directions of the optical axes of the imaging units adjacent to each other are different (see figure 4A and 4B: the lens of each of the sensors is shifted causing the adjacent imaging units to each have an optical axis in a different direction).

It would have been obvious to one of ordinary skill in the art at the time of invention to have been motivated to modify the imaging device of Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, to have a plurality of imaging units, said plurality of imaging units are two-dimensionally arranged in rows and columns, with an optical axis of each imaging unit defined as an axis through a common object point at an imaging position and the center of each imaging lens, and the directions of the optical axes of the imaging units adjacent to each other are different, in order to capture more light by better focusing the light from the lens onto the imaging devices, creating a higher quality image with less shading.

In regard to claim 2, Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1. The Takada reference discloses wherein said illumination device is located at a

position where a subject is illuminated from a periphery of said imaging device or said imaging lens (see figure 8).

In regard to claim 3, Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1. The Takada reference discloses in another embodiment wherein said illumination device comprises a common light source located behind said imaging devices (see figure 7, element 28 and 36).

It would have been an obvious design choice to one of ordinary skill in the art at the time of invention to modify the illumination device of the Takada reference to be located behind the imaging system, in order to improve the layout of the iris camera and save space.

In regard to claim 5, Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1. The Takada reference discloses wherein said illumination device is located at a position where illumination light is directed coaxially with respect to the optical axes of said imaging units (see figure 8, dashed line: the illumination light as directed along the optical axis of the of the imaging unit after reflecting off mirror 22).

In regard to claim 6, Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1. The Takahashi reference discloses wherein said plurality of imaging lenses is a lens array with integrally formed lenses (see figure 4B, element 4 and para 43).

In regard to claim 7 Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 6. The Takahashi reference discloses wherein said lens array is located at a position adjustable in a normal direction to a plane thereof (see column figures 4A & B and para 44-47: each lens is adjusted, in a normal direction to a plane through the lens, to various distances skewed to the right or the left of the imaging devices so that more light can be captured).

In regard to claim 8 Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 6. The Takahashi reference discloses wherein said lens array is located at a position adjustable in two orthogonal directions in a plane thereof (see column figures 4A & B and para 44-47: each lens is adjusted, in two orthogonal directions to the right and to the left of a plane through the lens, to various distances skewed from the imaging devices so that more light can be captured).

In regard to claim 9 Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1. The Takahashi reference discloses wherein each of said imaging units is located with a center substantially in alignment with an optical axis thereof (see figure 4B).

In regard to claim 10 Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1. The Takahashi reference discloses wherein in each of said plurality of imaging units, said imaging lens and said imaging device are located such that in adjoining

imaging units, a spacing between said imaging lenses is larger than that between said imaging devices (see figure 4B).

In regard to claim 13 Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1. The Takahashi reference discloses wherein said imaging lenses are each the same shape (see figure 4B, element 5).

In regard to claim 14 Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1. The Takahashi reference discloses wherein the optical axis of said each imaging unit is substantially in alignment with the optical axis of said each imaging lens (see figure 4B).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, as applied to claim 1 above, and further in view of Wildes et al., US 5,751,836.

In regard to claim 4 Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1. The Takada and Takahashi references do not disclose wherein said illumination device comprises a plurality of illumination light sources, wherein said plurality of illumination light sources are each located with respect to each of said plurality of imaging units.

Wildes et al., US 5,751,836, discloses an imaging system for eye recognition with an array of light sources (see figure 2, element 202) which surround the imager (column 3, lines 41-44).

It would have been obvious to one of ordinary skill in the art at the time of invention to have been motivated to modify Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, and further in view of Wildes et al., US 5,751,836, wherein said illumination device comprises a plurality of illumination light sources, wherein said plurality of illumination light sources are each located with respect to each of said plurality of imaging units, in order to illuminate the entire eye with an even amount of light, to provide a higher quality image without shading.

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, as applied to claim 1 above, and further in view of Cox et al., US 6,556,349.

In regard to claim 11 Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1. The Takada and Takahashi references do not disclose wherein each of said imaging lenses and each of said imaging devices are arranged in an at least one direction and on a concavely curved surface with respect to said common object point.

Cox et al., US 6,556,349, discloses an image sensor wherein each of said imaging lenses and each of said imaging devices are arranged in an at least one direction and on a concavely curved surface with respect to said common object point (see figure 4). Shifting the lenses to the left or right and arranging the lenses at distances that form a concave shape are design equivalents to properly align the light onto the image sensor.

Therefore, it would have been an obvious design decision for one of ordinary skill in the art at the time of invention to modify the image sensor and lenses of the Takahashi reference with the lens arrangement of the Cox reference wherein each of said imaging lenses and each of said imaging devices are arranged in an at least one direction and on a concavely curved surface with respect to said common object point, in order to capture more light by better focusing the light from the lens onto the imaging devices, creating a higher quality image with less shading while providing a different lens arrangement that might better suite the camera for certain design configurations.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, as applied to claim 1 above, and further in view of Fukuma et al., US 5,886,780.

In regard to claim 12 Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, discloses the imaging system according to claim 1 as described above. The combination of Takada and Takahashi further discloses an identity authentication system. The Takada reference discloses comprising: a data generation block (see figure 5, element 36), and an identification block (see figure 5, element 40), wherein: in said imaging system, said each imaging unit simultaneously picks up images inclusive of an image of a pupil of an individual to be authenticated, which is located at an object-point position (see figure 6, step 5 and column 6, lines 6-10), said data generation block extracts, from a synthesized fundus image, data indicative of traits thereof, and said identification

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block compares extracted data with separately stored data (see figure 6, step 6 and column 6, lines 11-15).

The Takada and Takahashi references do not disclose comprising a fundus image synthesis block wherein said fundus image synthesis block comprises a step of cutting the image of the pupil of the individual to be authenticated out of each of the images picked up by said imaging system, and a step of using cut-out images of the pupil as pixels to rearrange said pixels corresponding to an arrangement of said imaging units for synthesis of a fundus image.

Fukuma et al., US 5,886,780, discloses an imaging system with a fundus image synthesis block (see figure 7, element 91) that synthesizes a fundus image and provides it for the display to display (see figure 7 and column 7, lines 54-56).

It would have been obvious to one of ordinary skill in the art at the time of invention to have been motivated to modify Takada et al., US 7,176,973, in view of Takahashi et al., US 2001/0026322, and further in view of Fukuma et al., US 5,886,780, to have a fundus image synthesis block wherein said fundus image synthesis block comprises a step of cutting the image of the pupil of the individual to be authenticated out of each of the images picked up by said imaging system, and a step of using cut-out images of the pupil as pixels to rearrange said pixels corresponding to an arrangement of said imaging units for synthesis of a fundus image, in order have the added functionality of being able to display the fundus image, so the user can verify the image was captured correctly.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GEVELL SELBY whose telephone number is (571)272-7369. The examiner can normally be reached on 8:00 A.M. - 5:30 PM (every other Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on 571-272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

gvs

/Lin Ye/
Supervisory Patent Examiner, Art Unit 2622